

Performance of D -parameters in isolating meteor showers from the sporadic background

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ABSTRACT

It is often necessary to draw a division between meteor showers and the sporadic meteor complex in order to study these components of the meteoroid environment. Meteor showers persist for less than a season and are composed of members with a greater-than-average degree of orbital similarity. The level of orbital similarity is often quantified using so-called D -parameters; a D -parameter cutoff may be employed to define or extract a shower. Depending on the study, this cutoff value may be chosen based on the size of the data-set, the percentage of sporadic meteors within the data-set, or the inclination of the shower in question. We argue that the cutoff value should also reflect the strength of the shower compared to the local sporadic background. We therefore present a method for determining, on a per-shower basis, the D -parameter cutoff that limits the false-positive rate to an acceptable percentage. If the false-positive rate exceeds this percentage regardless of cutoff value, we deem the shower to be undetectable in our data. We apply this method to optical meteor observations from the NASA All-Sky and Southern Ontario Meteor Networks and present the detectable meteor showers and their characteristics.